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EXAMINER	
GOUDREAU, GEORGE A	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/829,061	KELLER, DAVID J.	
	Examiner	Art Unit	
	George A. Goudreau	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

George A Goudreau

GEORGE GOUDREAU
PRIMARY EXAMINER
3-06

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This action will not be made final due to the new grounds of rejection.

2. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.

3. Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-In the claims, the usage of the term "about" is vague, and indefinite.;

-Claims 3, and 6 are redundant upon each other.; and

-In claim 7, the phrase "the dielectric layer" lacks proper antecedent basis.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Tseng (5,192,702).

Tseng disclose a process for anisotropically mrie etching a polysi layer (32) on a wafer using a SiO2 etch mask (38), and a plasma which is comprise of HBr-Cl2-(He-O2). The HBr flow rate is (25-45) sccm. The (He-O2) flow rate is (6-10) sccm. This is discussed specifically in column 5; and discussed in general in columns 1-14. This is shown specifically in figures 4-6; and shown in general in figures 1-33.

6. Claims 1, 3, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Yu et. al. (5,723,893).

Yu et. al. disclose a process for anisotropically rie etching a gate electrode on a wafer which is comprised of the following steps:

-A laminate which is comprised of a gate oxide layer (14)/ a polysi layer (20)/ a silicide layer (22)/ a doped polysi layer (24) is formed onto the surface of a wafer (10).;

-The doped polysi layer/ silicide layer/ polysi layer are anisotropically rie etched.; and

-The polysi layer (24) is over-etched in a plasma, which is comprised of HBr-(He-O2)-He. (The flow rate of the (He-O2) is (3-5) sccm. The flow rate of the HBr is (100-200) sccm. The flow rate of the He is (100-150) sccm.)

This is discussed specifically in column 5; and discussed in general in columns 1-10. This is shown specifically in figures 1-2; and shown in general in figures 1-5.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-3, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et. al. (6,156,629)

Tao et. al. disclose a process for anisotropically rie etching a gate on a wafer using a three step etching process, which is conducted in a TCP plasma rie etcher. The three step etching process is comprised of the following steps:

-A laminate which is comprised of a SiO2 gate oxide layer (14)/ a polysi layer (18)/ a SiO2 hard mask layer (22)/ a BARC layer (26)/ a photo resist layer (30) is formed on the surface of a Si wafer.;

-The photo resist layer is patterned to form an etch mask.;

-The BARC layer is etched in a first etching step.;

-The SiO2 hard mask layer (22) is etched in a second etching step.; and

-The polysi layer (18) is rie etched in a third etching step using a plasma, which is comprised of (He-O2)-Cl2-HBr. The (He-O2) flow rate in the plasma is (0-20) sccm. The HBr flow rate in the plasma is (50-400) sccm.

This is discussed specifically in columns 9-12; and discussed in general in columns 1-12. This is shown in figures 1-5. Tao et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

the specific usage of He as an inert gas diluent in the plasma etchant; and

-the specific etching process parameters, which are claimed by the applicant for the polysi-etching step

It would have been obvious to one skilled in the art to employ He as an inert gas diluent in the plasma etchant, which is taught above, based upon the following. The

usage of He as an inert gas diluent in a plasma etchant is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, this would have simply provided a desirable means for balancing the plasma etchant in the process taught above.

It would have been prima facie obvious to employ any of a variety of different etching process parameters in the etching process, which is taught above including those, which are specifically claimed by the applicant. These are all well-known variables in the plasma etching art, which are known to effect both the rate and the quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific etch process parameters which are claimed by the applicant in the etching process which is taught above based upon In re Aller as cited below.

Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.≅ In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters, which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

9. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen et. al. (5,948,803).

Shen et. al. disclose a process for anisotropically rie etching a gate on a wafer using a two step etching process, which is conducted in a TCP rie etcher. The two step etching process is comprised of the following steps:

-A laminate which is comprised of a SiO2 gate layer (10)/ a polysi layer (12)/ a WSi2 layer (14)/ a cap polysi hard mask layer (16)/ a SiON BARC layer (18)/ a photo resist layer (20) is formed onto the surface of a wafer.;

-The photo resist layer is patterned to form an etch mask.;

-The SiON layer, the polysi cap layer, the WSi2 layer, and the top portion of the polysi layer are anisotropically rie etched in a first etching step.; and

-The remainder of the polysi layer is anisotropically rie etched in a plasma, which is comprised of Cl2-HBr-(He-O2).

This is discussed specifically in column 5; and discussed in general in columns 1-8. This is shown specifically in figures 4-8; and shown in general in figures 1-8. Shen et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

-the specific usage of Si3N4 as the BARC layer in the process which is taught above;

-the specific usage of a TCP rie etcher to conduct the etching process, which is taught above;

-the specific usage of He as an inert gas diluent in the plasma etchant; and

-the specific etching process parameters, which are claimed by the applicant for the second polysi etching, step in the process, which is taught above

It would have been obvious to one skilled in the art to employ Si3N4 as the BARC layer in the etching process, which is taught above, based upon the following. The usage of Si3N4 as a BARC layer is conventional or at least well known in the semiconductor fabrication arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for providing a BARC layer in the etching process, which is taught above to the specific means, which are taught above.

It would have been obvious to one skilled in the art to employ a TCP rie etcher to conduct the etching process, which is taught above based upon the following. The usage of a TCP rie etcher to conduct a plasma etching process is conventional or at least well known in the etching arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for conducting the etching process taught above to the specific means, which are taught above.

It would have been obvious to one skilled in the art to employ He as an inert gas diluent in the plasma etchant, which is taught above, based upon the following. The usage of He as an inert gas diluent in a plasma etchant is conventional or at least well known in the plasma etching arts. (The examiner takes official notice in this regard.) Further, this would have simply provided a desirable means for balancing the plasma etchant in the process taught above.

It would have been prima facie obvious to employ any of a variety of different etching process parameters in the etching process, which is taught above including those, which are specifically claimed by the applicant. These are all well-known variables in the plasma etching art, which are known to effect both the rate and the quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific etch process parameters which are claimed by the applicant in the etching process which is taught above based upon In re Aller as cited above. Further, all of the specific process parameters, which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the reference as applied in paragraph 6 above.

The reference as applied in paragraph 6 above fail to disclose the following aspects of applicant's claimed invention:

-the specific etching process parameters, which are claimed by the applicant for the polysi-etching step

It would have been prima facie obvious to employ any of a variety of different etching process parameters in the etching process, which is taught above including those, which are specifically claimed by the applicant. These are all well-known

variables in the plasma etching art, which are known to effect both the rate and the quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific etch process parameters which are claimed by the applicant in the etching process which is taught above based upon In re Aller as cited above. Further, all of the specific process parameters, which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication should be directed to examiner George A. Goudreau at telephone number (571)-272-1434.

George A. Goudreau
Primary Examiner
Art Unit 1763